

SECTION 03 01 08
CONCRETE RESTORATION

PART 1 – GENERAL

1.01 SECTION INCLUDES

- A. Cutting and chipping.
- B. Repairing of cracks.
- C. Restoration work.
- D. Removal of paint.

1.02 MEASUREMENT AND PAYMENT

- A. Measurement: Repair and restoration of existing concrete work will be measured for payment by the lump-sum method, acceptably performed and completed.
- B. Payment: Repair and restoration of existing concrete work will be paid for at the indicated Contract lump-sum price as indicated in the Bid Schedule of the Bid Form.

1.03 RELATED SECTIONS

- A. Coordinate the Work of this Section with the Work of other Sections specifying remedial work, corrective measures, and restoration work, including Section 01 71 23, Field Engineering, Section 01 74 14, Cleaning, and Section 02 41 19, Selective Structure Demolition.
- B. Surface Preparation as specified in Section 09 91 00, Painting.

1.04 REFERENCES

- A. American Society for Testing and Materials (ASTM):
 - 1. ASTM C881/C881M Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete
 - 2. ASTM C928/C928M Standard Specification for Packaged, Dry Rapid-Hardening Cementitious Materials for Concrete Repairs
 - 3. ASTM C1107/C1107M Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink)

1.05 REGULATORY REQUIREMENTS

- A. In addition to the foregoing referenced standards, the regulatory requirements which govern the work of this Section include the following code requirements:
 - 1. California Code of Regulations (CCR), Title 24, Part 10, California Existing Building Code

1.06 DESCRIPTION

- A. The station or building involved in this work will be in continuous operation during the construction period. This will require that the Contractor plan the Work carefully to work around unavoidable obstacles in the prosecution of the Work. It will require further that the Contractor complete some new construction facilities required in the renovation work before proceeding with the concrete restoration work.
- B. Provide such additional temporary facilities as may be required to facilitate continuous, unobstructed station or building operations during transitional construction work.

1.07 QUALITY ASSURANCE

- A. Repair and restoration of existing concrete surfaces shall be performed by a skilled and experienced subcontractor specializing in the restoration of concrete with at least five years' experience in the type of work involved.
- B. Repair and restoration of existing concrete work shall achieve security, strength, and weather protection, as applicable and required, and shall preserve the integrity and continuity of fire-rated assemblies.
- C. Repair and restoration of existing concrete work shall successfully duplicate undisturbed adjacent finishes, colors, textures, and profiles. Where there is a dispute as to whether or not duplication is successful or has been achieved to a reasonable degree, the Engineer's judgment shall be final.

PART 2 – PRODUCTS

2.01 MATERIALS, EQUIPMENT, AND FACILITIES

- A. Requirements: Provide all materials, equipment, tools, appurtenances, facilities, and services as required for performing and completing all repair and restoration of existing concrete as indicated.
- B. Equipment, Tools, and Materials: Provide appropriate and proper equipment, tools, and materials for the chipping and air-pressure cleaning of cracks in concrete, for pressure injection grouting of cracks in concrete, for sandblasting or water-blasting of concrete surfaces, and for hose cleaning of concrete.

- C. Concrete Bonding Agent: Adhesive for the bonding of new mortar and grout to existing concrete shall be an epoxy adhesive meeting requirement of ASTM C881/C881M, of type required for the conditions.
- D. Mortar and Cementitious Repair Materials:
 - 1. Mortar: Mortar shall be an epoxy mortar, polymer-fortified mortar, or similar high-strength bonding mortar conforming with ASTM C928/C928M. Minimum compressive strength at 28 Days shall be 4,000 psi.
 - 2. Sand: Sand shall be a clean, washed, kiln-dried, fine sand, all passing a U.S. Standard No. 16 sieve.
- E. Grout: Grout for pressure-injection grouting shall be a high-strength, nonshrink, cementitious, adhesive grout conforming with ASTM C1107/1107M, or a high-strength, nonshrink, manufactured epoxy adhesive grout. Minimum compressive strength at 28 Days shall be 5,000 psi.
- F. Cleaning Agent: Mild solution of hydrochloric acid or muriatic acid, for washing of stubborn stains on concrete.
- G. Paint: Paint for touchup work shall be an exterior acrylic-latex masonry paint, flat texture, color as required to match adjacent surfaces.

PART 3 – EXECUTION

3.01 REQUIREMENTS

- A. Perform cutting, chipping, patching/restoring work, and cleaning in a manner to prevent damage to other work, and as required to return exterior building surfaces to essentially their original condition and configuration.
- B. Major cracks shall be repaired and filled by pressure-injection grouting. All other cracks shall be repaired in the manner most appropriate and as required for weatherproofing or waterproofing the building or structure.
- C. Do not cut or alter structural members when not indicated without prior approval of the Engineer.
- D. Finish or refinish as required to match adjacent finishes.

3.02 CUTTING AND CHIPPING

- A. Cutting and chipping work shall be neatly and accurately performed with proper tools and equipment. Cuts shall be of minimum size required for the work. Check the locations carefully of existing concrete reinforcement before cutting or chipping.
- B. Pachometer readings shall be taken by the Contractor's employed testing laboratory to locate reinforcing steel in existing concrete to be cut or chipped.

- C. Existing work to remain shall be properly protected to prevent damage from cutting and chipping operations.

3.03 REPAIRING OF CRACKS

- A. Cracks shall be repaired and filled with grout by the pressure-injection process. Concrete cracks shall be mapped, and the injection shall be on center-to-center spacing as necessary to achieve proper structural bonding.
- B. Adhesive material shall be mixed with grout in proportion necessary to provide structural bonding of concrete. Grout material shall be inserted into cracks by pressure-injection grouting in accordance with the manufacturer's installation instructions and recommendations.
- C. Minor cracks too small for injection grouting shall be repaired as specified in Article 3.04 for restoration work.
- D. Small holes, cracks, and other imperfections to be painted shall be suitably primed and patched with a compound recommended by the manufacturer of the paint to be applied to these surfaces as specified in Section 09 91 00, Painting.

3.04 RESTORATION WORK

- A. Preparation of Existing Surfaces: Where concrete is cracked or spalled, cut or chip out to solid surface. Use power wire brush and high pressure air to clean concrete of dirt, dust, and loose particles. Clean exposed reinforcing bars with power wire brushing to remove all visible corrosion.
- B. Repairing of Concrete:
 - 1. Repairing and patching of existing concrete work shall be expertly performed with specified adhesive, mortar, and grout materials. At completion, patched surfaces shall match adjacent existing surfaces as closely as possible.
 - 2. Concrete bonding agent, mortar, and grout shall be applied or installed where indicated, or where otherwise required, in accordance with the manufacturer's instructions and recommendations.
 - 3. Where necessary to build out cut, spalled, or chipped concrete surfaces, mix concrete bonding agent, mortar, and sand into a special mortar, and apply in layers as required to fill out or build up surfaces. Float, trowel, or texture surfaces to match adjacent existing surfaces.

3.05 REMOVAL OF PAINT

- A. Where removal of existing paint film is required for restoration of concrete surfaces, existing painted concrete and stucco surfaces shall be sandblasted by the "wet" sandblast method to remove all such paint film. Surfaces not to be sandblasted shall be properly masked and otherwise protected to preclude any damage to these surfaces.

- B. Wet sandblasted surfaces shall be thoroughly dry or dried before painting as specified in Section 09 91 00, Painting.

3.06 CLEANING

- A. Where existing concrete surfaces are indicated to be cleaned or washed to remove dirt, dust, and stains, such surfaces shall be washed clean to an even and uniform effect, free of stains and blemishes. Include adjacent cornices, ledges, and masonry ornaments. Method of cleaning (e.g. high-pressure water, steam cleaning, or diluted acid cleaning) are subject to approval by the Engineer.
- B. All adjacent glass areas shall be cleaned after washing of concrete surfaces.
- C. Replace any glass damaged by the cleaning operations.

END OF SECTION 03 01 08